

BEFORE THE  
FEDERAL COMMUNICATIONS COMMISSION  
WASHINGTON, D.C. 20554

IN THE MATTER OF:

AMENDMENT OF THE COMMISSION'S  
RULES TO ESTABLISH A SINGLE AM  
RADIO STEREOPHONIC TRANSMITTING  
EQUIPMENT STANDARD

ET DOCKET NR 92-298

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COMMENTS OF  
LEE SUTHERLAND PARR

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

I AM A SEMI RETIRED BROADCAST ENGINEER OF SOME EXPERIENCE. I AM A MEMBER OF THE SOCIETY OF BROADCAST ENGINEERS, THE AUDIO ENGINEERING SOCIETY, AND I.E.E.E. I AM CERTIFIED AS A BROADCAST AND COMMUNICATIONS ENGINEER BY THE S.B.E., N.A.R.T.E. AND N.A.B.E.R. I FILED COMMENTS IN THE COMMISSIONS ORIGINAL INQUIRY INTO AM STEREO OPERATION IN DOCKET NR 21313. I HAVE HELD A COMMISSION ISSUED COMERCIAL RADIO TELEPHONE OPERATOR'S LICENSE SINCE 1966, AS WELL AS AN AMATEUR ADVANCED CLASS LICENSE.

THE CURRENT NOTICE OF PROPOSED RULE MAKING IS AN INSULT TO BROADCAST ENGINEERING. NOWHERE IN THE NOTICE IS THE QUESTION OF TECHNICAL COMPETENCE RAISED. RATHER, WHAT IS PROPOSED IS A TRIUMPH OF MARKETING MUSCLE OVER CONSIDERED ENGINEERING. THERE IS NO ATTEMPT AT A CONSIDERED STUDY OF THE TECHNICAL MERITS AND DEMERITS OF THE VARIOUS SYSTEMS. I WILL GO SO FAR AS TO SAY THAT THE PROBLEM WITH AM STEREO HAS NOT BEEN THE LACK OF A STANSARD (WHAT IS THE "STANDARD" FOR VIDIO TAPE, OR PHONOGRAPH RECORDS; VARIOUS SPEEDS AND FORMATS ARE ACCOMMODATED IN THE MARKET). THE PROBLEM HAS BEEN THAT BROADCASTERS WILL NOT ACCEPT THE ONLY SYSTEM FOR WHICH RECEIVERS HAVE BEEN AVAILABLE. ORIGINAL EQUIPMENT AUTOMOBILE RECEIVERS HAVE ONLY BEEN AVAILABLE IN MOTOROLA C-QUAM. HERE IS THE BROADCASTER'S LARGEST MARKET WITH AMPLE NUMBERS OF C-QUAM RECEIVERS ---YET, WE DID NOT INSTALL C-QUAM EXCITERS AT OUR RADIO STATIONS! WHY? COULD IT HAVE BEEN THAT I WOULD NOT ENTRUST MY SIGNAL TO ONE OF THOSE MACHINES?

I BELIEVE THAT THE COMMISSION OWES IT TO ITSELF AND TO THE INDUSTRY TO INQUIRE OF THE STATIONS THAT WENT STEREO WHY THEY CHOOSE THE SYSTEM THEY DID. AND, WAS THE DECISION MADE BY THE ENGINEER OR THE SALES MANAGER? THE COMMISSION HAS THE POWER OF SUBPENA; IT SHOULD USE THIS POWER TO INQUIRE AS TO WHY ALL BUT C-QUAM RECEIVERS DISAPPEARED SO QUICKLY. WAS IT A LACK OF MARKET ACCEPTENCE OR WERE THERE OTHER CONSIDERATIONS?

WHAT ARE OUR CHOICES? IN THE BEGINNING THERE WERE FIVE SYSTEMS. MAGNAVOX (THE COMMISSION'S ORIGINAL CHOICE) AND BELAR PROPOSED AM/FM SYSTEMS WHERE THE STEREO INFORMATION WAS TRANSMITTED BY MODULATING THE AM CARRIER FREQUENCY SLIGHTLY. THIS, HOWEVER, IMPOSED SEVERE LIMITATIONS ON AM DOWNWARD OR "NEGITIVE" MODULATION. LIMITATIONS THAT WERE UNACCEPTABLE TO BROADCASTERS. THESE SYSTEMS WERE NEVER A FACTOR, A TOTAL OF THREE MAGNAVOX AND ZERO BELAR BEING INSTALLED.

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MOTOROLA AND HARRIS BROADCAST PROPOSED "QUADRATURE" SYSTEMS WHERE THE STEREO INFORMATION WAS TRANSMITTED BY SHIFTING THE AM SIDEBANDS SLIGHTLY IN TIME, RELATIVE TO EACH OTHER. THIS CARRIES WITH IT TWO PIECES OF BAGGAGE. FIRST DIRECTIONAL ANTENNAS AND LONG TRANSMISSION PATHS (ESPECIALLY ADJACENT CHANNELS AND NIGHT TIME SKYWAVE) DO UN-NICE THINGS TO QUADRATURE SIGNALS, MODIFYING THE SIGNAL THAT THE RECEIVER SEES AND THUS CHANGING THE PERCEIVED STEREO IMAGE. THE SECOND PROBLEM IS THAT LARGE AMOUNTS OF QUADRATURE MODULATION WILL PRODUCE DISTORTION IN THE COMMON ENVELOPE OR "DIODE" DETECTOR USED BY MOST AM RECEIVERS TO DEMODULATE, OR CONVERT TO AUDIO, THE RADIO SIGNAL. SINCE THIS DISTORTION IS AT ITS WORST ONLY WHEN THERE IS A LOT OF LEGITIMATE PROGRAMME INFORMATION TO OVERRIDE IT HARRIS CHOSE TO IGNORE IT (THIS WAS THE SOURCE OF THE BIG FLAP WHERE HARRIS EXCITERS WERE ORDERED OFF THE AIR FOR A SHORT TIME AND THEN THE RULES CHANGED). MOTOROLA, ON THE OTHER HAND, CHOSE TO ADD ARTIFACTS, PREDISTORTION, THAT WOULD, HOPEFULLY, COUNTERACT THE EFFECTS OF THE QUADRATURE DISTORTION IN THE RECEIVER. THE PROBLEM IS THAT THESE PREDISTORTION ARTIFACTS CONSUME A SIGNIFICANT AMOUNT OF BANDWIDTH (INDEED, I AM NOT SURE THAT C-QUAM CAN MEET THE RECENT TEN KILOHERTZ ENVELOPE THAT AM BROADCASTERS MUST NOW COMPLY WITH). IN ITS ORIGINAL PRESENTATION TWELVE YEARS AGO MOTOROLA INCLUDED SPECTRUM ANALYZER PHOTOGRAPHS OF ITS OCCUPIED BAND UNDER "TYPICAL" CONDITIONS OF MODULATION WITH "TYPICAL" MUSIC. ONLY PROBLEM WAS THAT I COULD NOT CONSIDER THEIR CHOICES "TYPICAL" OF ANY STATION OR PROGRAMMER THAT I HAD EVER WORKED FOR. ONE MUST ALSO BE VERY CAREFUL WHEN USING A SPECTRUM ANALYZER ON ANYTHING OTHER THAN STEADY TONES, BUT THAT IS ANOTHER STORY.

THIS LEAVES US WITH THE FIFTH SYSTEM, THE "OLD MAN OUT". THE KAHN SYSTEM IS UNIQUE IN THAT IT SEPARATES THE TWO AM SIDEBANDS WHICH IN NORMAL MONO AM TRANSMISSIONS ARE IDENTICAL IN TIME AND MAGNITUDE. GOING UP IN FREQUENCY FROM YOUR NOMINAL PLACE ON THE DIAL IS THE RIGHT CHANNEL AND GOING DOWN IS THE LEFT CHANNEL. IT WORKS! AND, IT IS RUGGED UNDER ADVERSE PROPAGATION CONDITIONS ---ENGINEERS LIKE IT! LONG DISTANCE HIGH FREQUENCY RADIO COMMUNICATIONS (AND THE AMATEUR SERVICE) USE A VARIANT OF THIS IN WHICH ONLY ONE SIDEBAND IS TRANSMITTED. INTERESTINGLY, IN COMMENTS FILED FOR DOCKET 21313 I NOTICED THAT THE VARIOUS COMPETING PROPONENTS HAD LESS BAD TO ADDRESS ABOUT THE KAHN SYSTEM (AND THEY HAD A VESTED INTEREST IN FINDING ALL THE BAD THEY COULD) THAN THEY DID ABOUT THE OTHER SYSTEMS IN COMPETITION.

THE COMMISSION HAS BEEN ASKED TO ADD ITS IMPRIMATUR TO THE "DE-FACTO" STANDARD. BUT, IF IT IS THE "STANDARD", WHY DOES IT NEED OUR BLESSING? PERHAPS, IT IS BECAUSE BROADCASTERS ARE UNWILLING TO ACCEPT IT. IS C-QUAM'S STRONG PENETRATION IN THE MARKET A RESULT OF TECHNICAL SUPERIORITY AND CONSUMER AND BROADCASTER ACCEPTANCE OR IS IT THE RESULT OF STRONG MARKETING PRESSURES THAT HAVE LEFT THE CONSUMER AND BROADCASTER WITH NO VIABLE CHOICES.

IF THE COMMISSION WHISHES TO BE DONE WITH THIS PROCEEDING FOR ONCE AND FOR ALL (AND NOT TO HAVE TO REVISIT IT ON REMAND) IT MUST DO IT RIGHT THIS TRIP. THERE MUST BE GOOD SOLID REASONS FOR THE COMMISSION'S DECISION. IF THE PURPOSE OF THIS PROCEEDING IS TO ADVANCE BROADCASTING; NOT JUST GOTTHROUGH THE MOTIONS BECAUSE THE CONGRESS SAID "DO IT", IT IS MANDATORY THAT THE COMMISSION DISCOVER WHY AN APPARANT LEADER AND "STANDARD" HAS NOT BEEN UNIVERSALLY ACCEPTED.

RESPECTFULLY,



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